

EXTRUSION DAYS BATCH-TO-CONTI



Raw Material Feeding Technology & Developments for Batch and Continuous Applications

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Batch Ingredient Feeding – Gain-in-Weight



Advantages

- Lower Equipment Costs
- Stable Weighing Environment
- Precise Batch Control

Disadvantages

- Lengthy Batch Times
- Increased Ingredient Segregation
- Limited Range of Ingredient Batch Size Ratio

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Batch Ingredient Feeding – Loss-in-Weight



Advantages

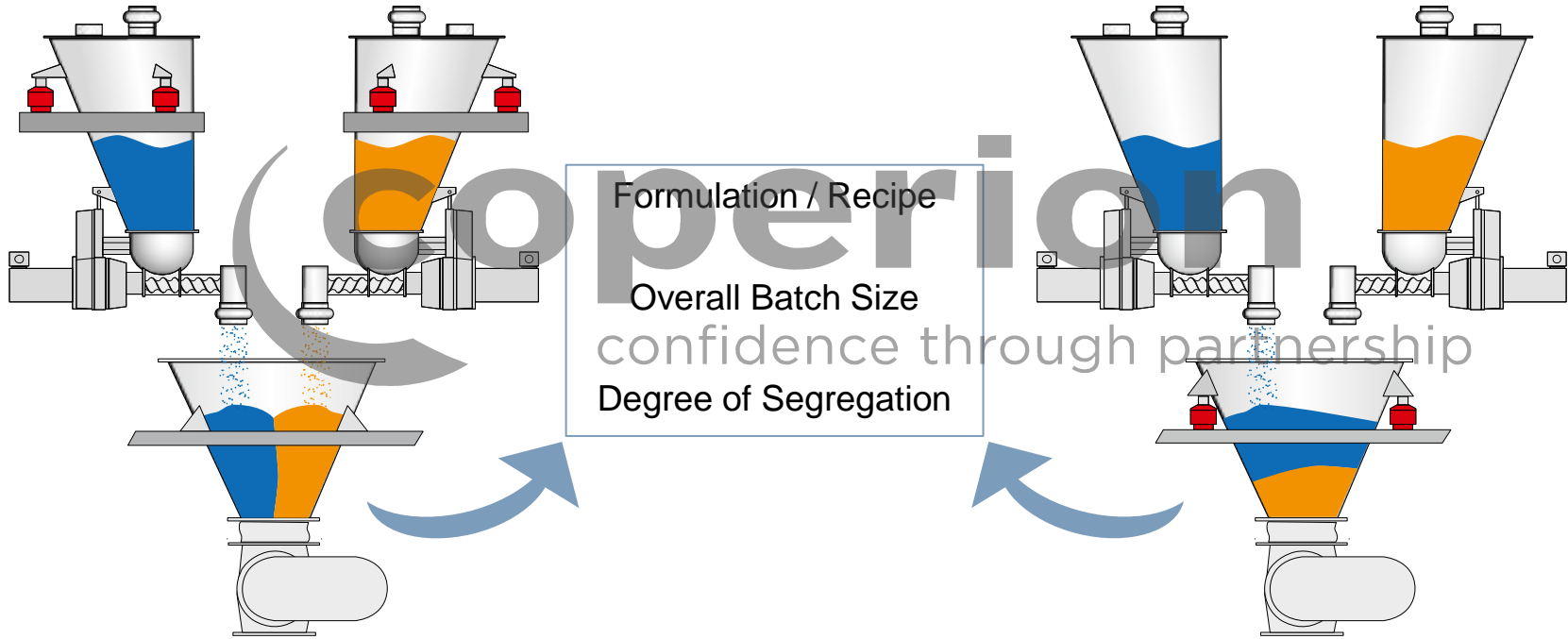
- Stable Weighing Environment
- Reduced Batch Times – Especially in Situations with Many Ingredients.
- Precise Batch Size Control
- Reduced Ingredient Segregation

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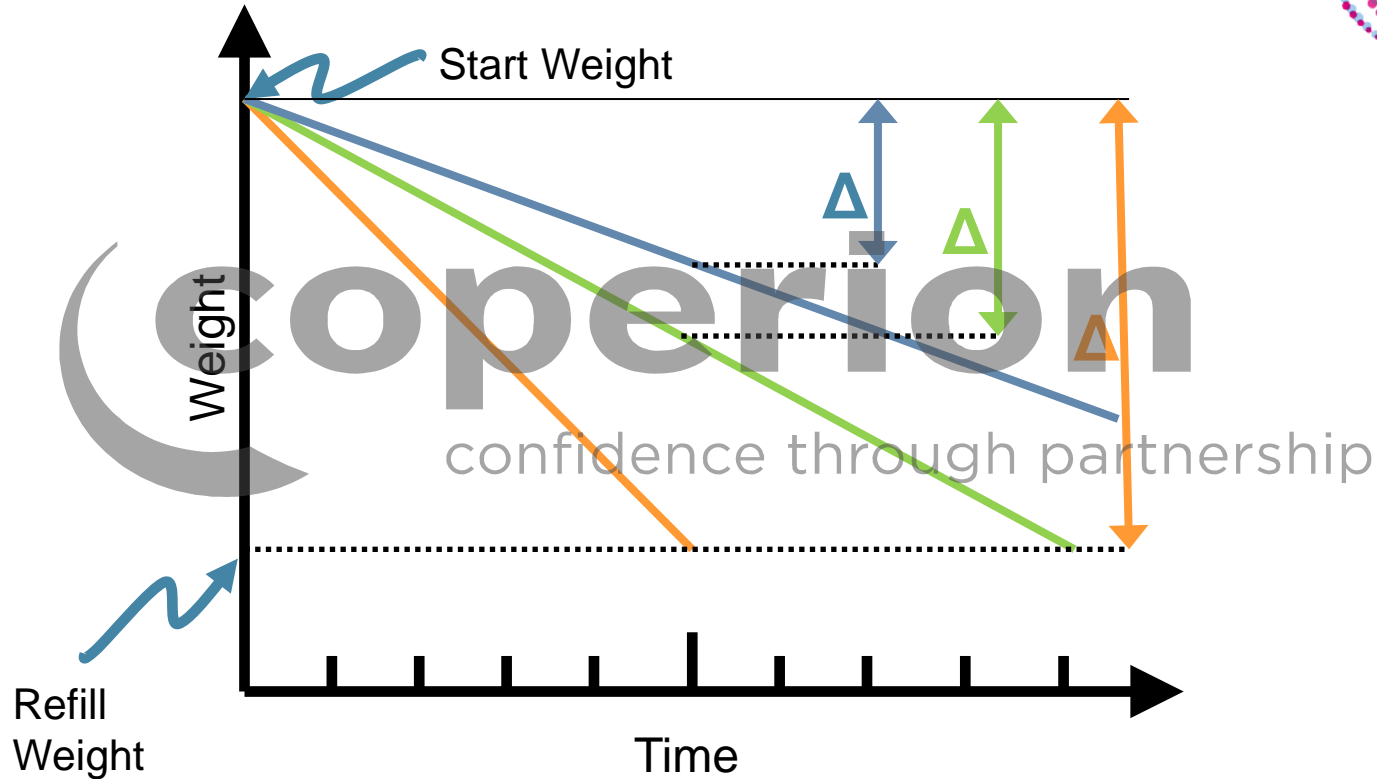
Disadvantages

- Higher Initial Equipment Costs

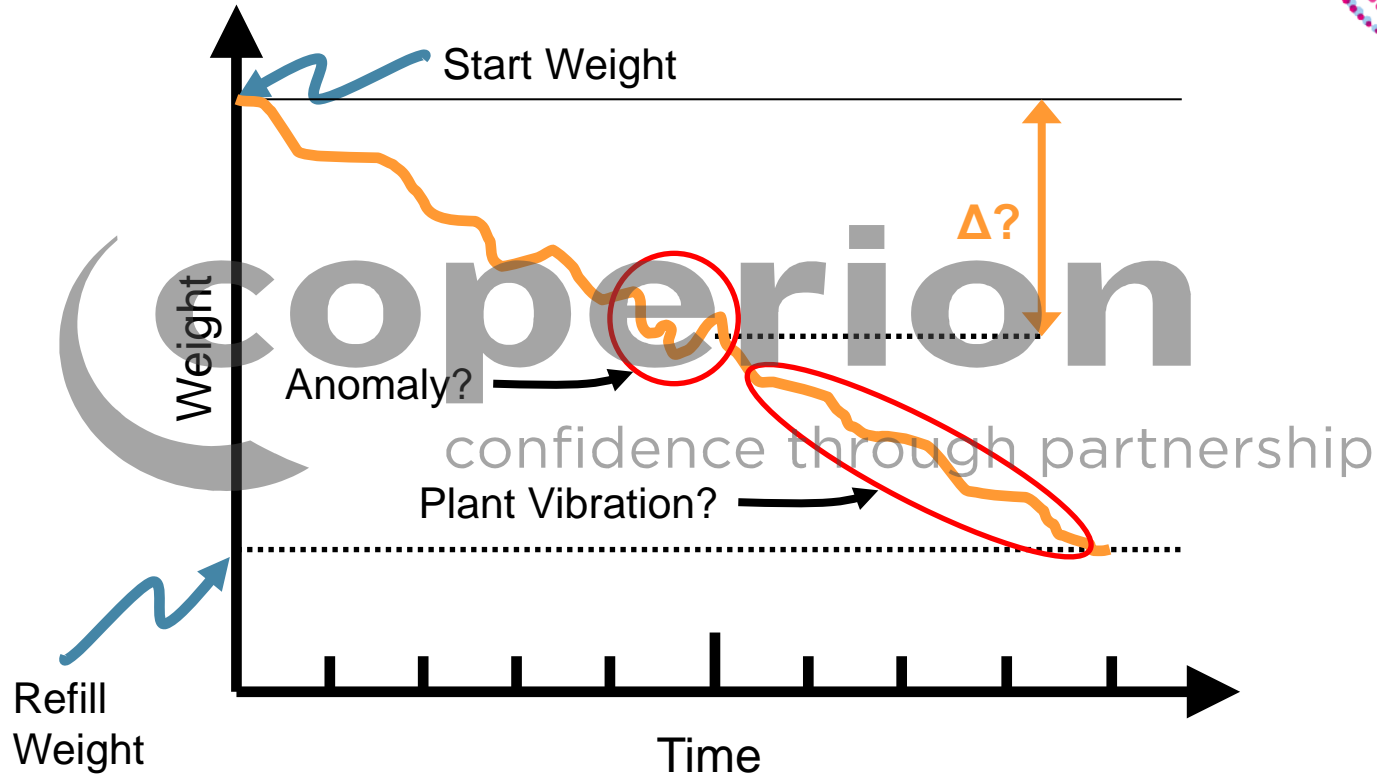
Quality Metrics – Batch Feeding



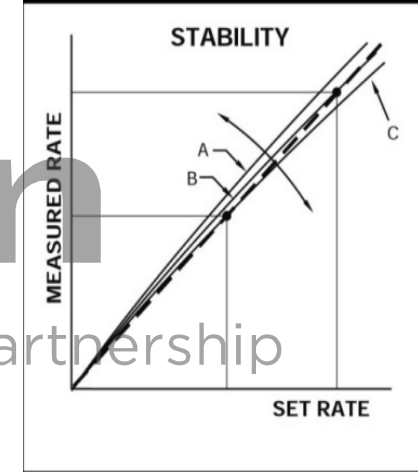
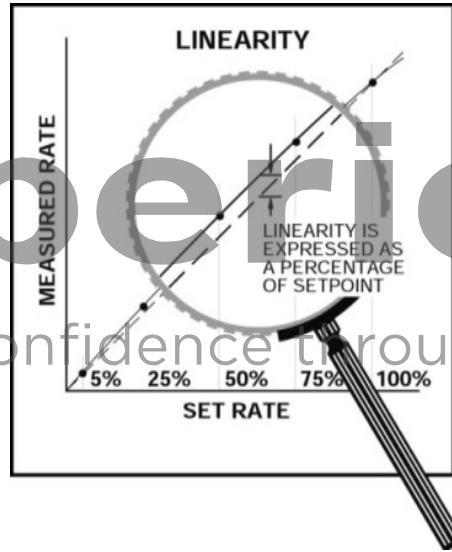
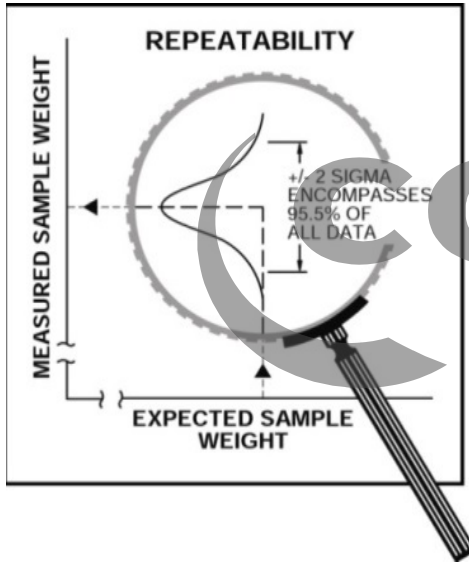
Continuous Feeding Theory



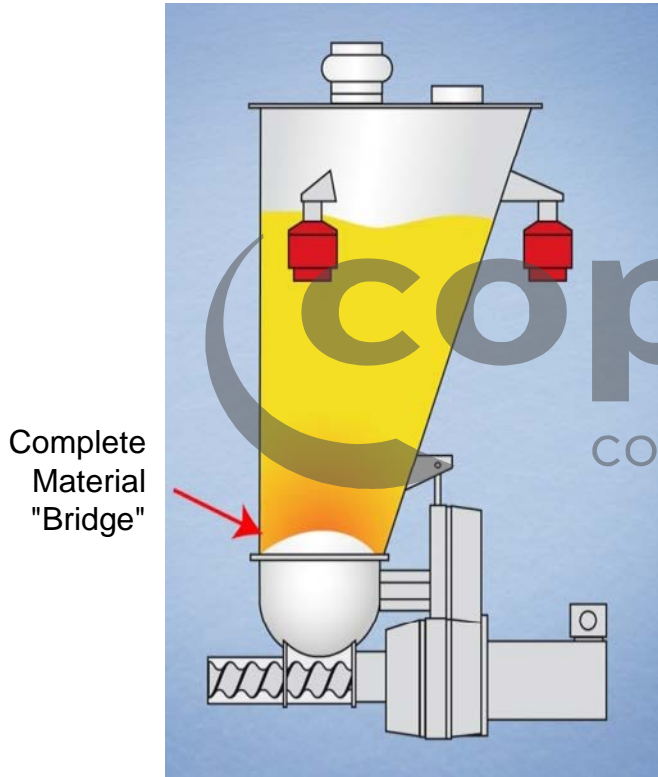
Continuous Feeding Reality



Quality Metrics – Continuous Feeding



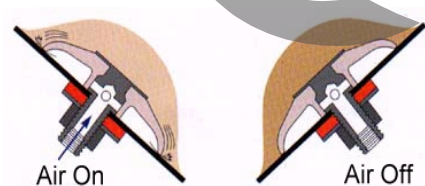
Material Flow Issues



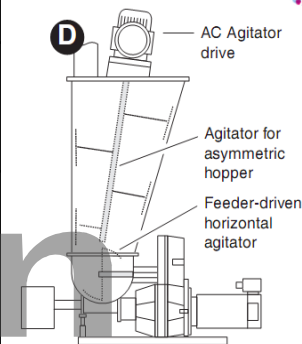
Some materials exhibit poor flow characteristics and may exhibit several severe issues:

- "Rat-Holes" where a narrow column of material in the center of the hopper will flow, but eventually starve the discharge device of material.
- Self-supporting "bridges" where the material completely suspends itself in the hopper while the discharge bowl/trough or discharge device are starved of material.

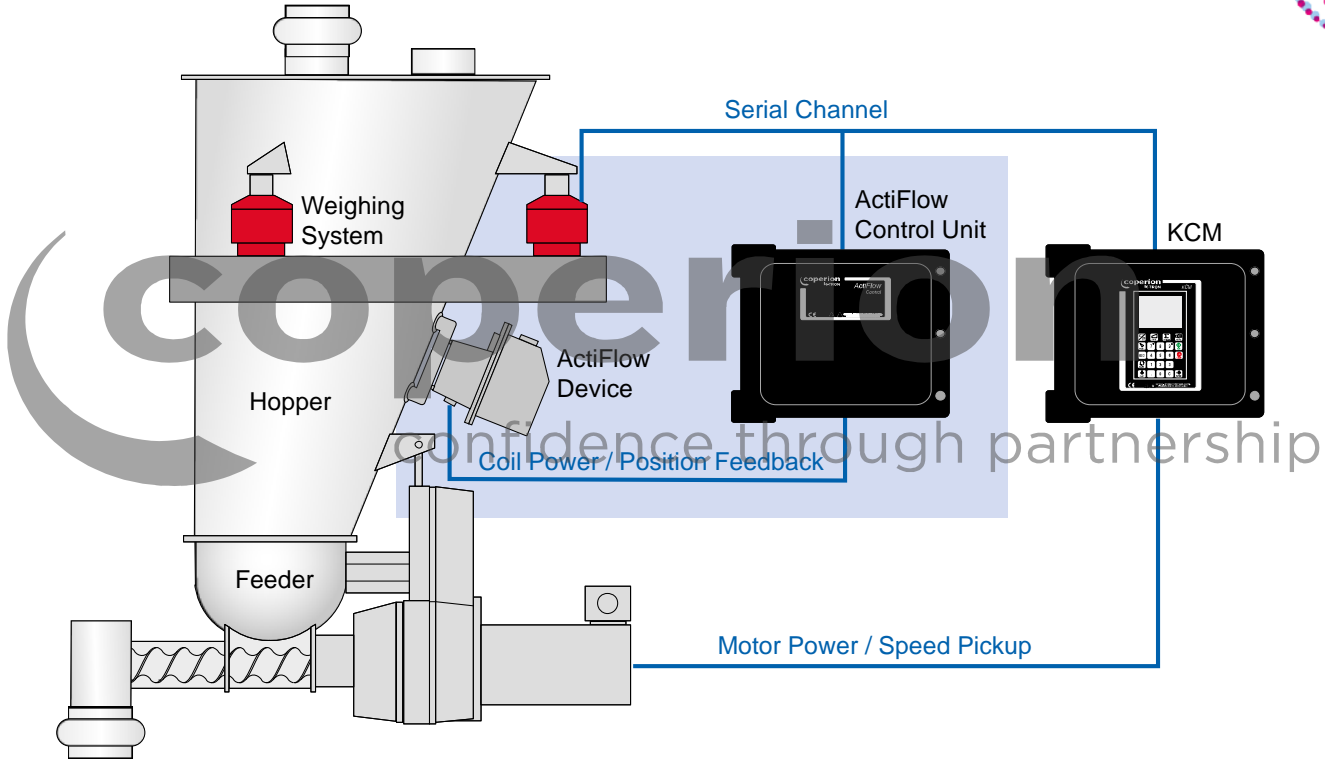
Material Flow Issues – Traditional Solutions



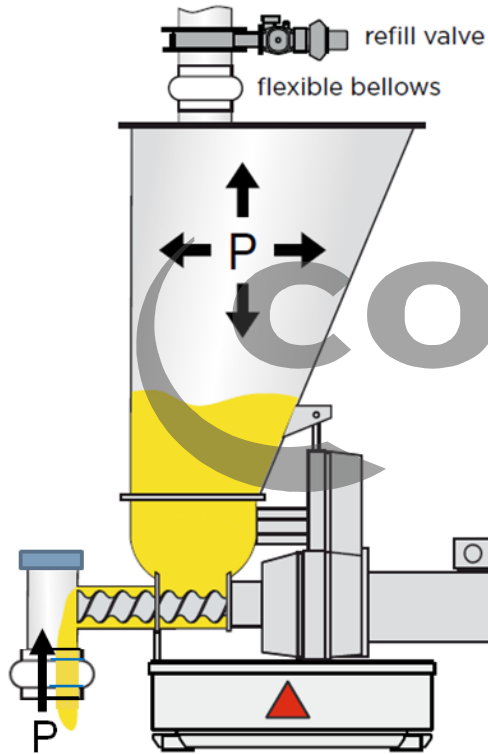
Solutions
Hopper Agitator Blades
Flexible Elastomer Liners (e.g. FlexWall, Shear Hoppers)
Bin Vibrators
Air Injectors / Fluidizers
Elastomer Coatings



Material Flow Issues – Detection and Prevention



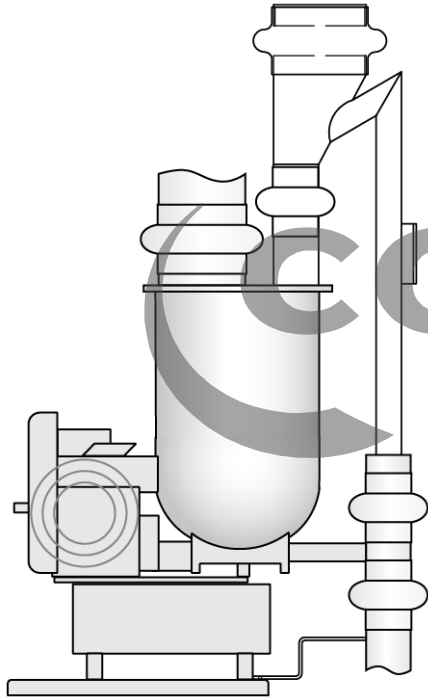
Pressure Compensation



- Pressure and Vacuum within the feed system cannot be distinguished from weight by the scale system.
- Fluctuations in pressures can sometimes be dramatic and induce massflow variations.
- Can be caused by clogged vent filters preventing air from displacing during refill.

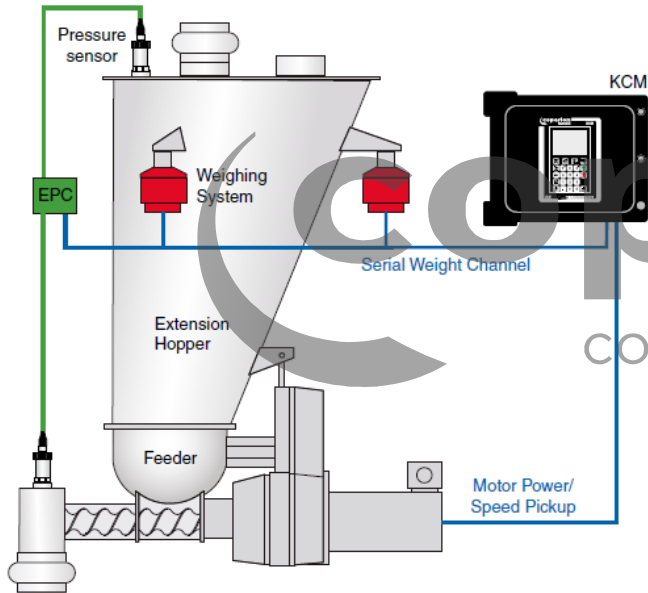
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Pressure Compensation – Traditional Solution



- Traditional mechanical solutions involving matching the surface areas – and therefore the forces – acting in opposing directions due to pressure.
- Expensive to fabricate and cumbersome to install.
- Availability of components such as caps, clamps, and flexes limit selections and usually make compensation imperfect.

Pressure Compensation – Modern Solution



- Adding pressure sensors into the control loop allows the controller to compensate for the effects of even varying pressure.
- Substantially simpler for systems that must be completely sealed or nitrogen purged.

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Thank you very much for your attention!



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